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ABSTRACT

This monograph presents the executive summaries of research syntheses developed at five special centers addressing assessment and interventions for children with attention deficit disorders (ADD). The Center at the Arkansas Children's Hospital (Roscoe A. Dykman et al.) reviewed the literature and conducted meetings on the assessment and characteristics of children with ADD. It found that ADD is the most common neurobehavioral disorder of children and that a large number of rating scales, tests, and interviews are available. The Center at the University of Miami (James D. McKinney et al.) also reviewed the literature on assessment and identification of ADD and found a lack of consensus on what constitutes a comprehensive assessment of ADD for educational purposes, a lack of studies showing the impact of ADD on specific instructional tasks, and a lack of guidelines on necessary assessment data. Thomas Fiore at the Center at the Research Triangle Institute (North Carolina) synthesized research on behavioral and educational interventions for children with ADD, including positive reinforcement, behavior reduction, response cost, cognitive behavioral training, parent or family training, task or environmental stimulation, and biofeedback. Barbara G. Burcham and Laurance B. Carlson at the University of Kentucky's Federal Resource Center investigated school based practices through identification of promising practices and site visits. Finally, James M. Swanson (University of California-Irvine Center), in a review of reviews, synthesized findings on the effects of stimulant medication on ADD children. (DB)

EXECUTIVE SUMMARIES OF RESEARCH SYNTHESES AND PROMISING PRACTICES ON THE EDUCATION OF CHILDREN WITH ATTENTION DEFICIT DISORDER

Education of Children with Attention Deficit Disorder

EXECUTIVE SUMMARIES OF RESEARCH SYNTHESES AND PROMISING PRACTICES ON THE EDUCATION OF CHILDREN WITH ATTENTION DEFICIT DISORDER

Prepared By

Chesapeake Institute

Prepared For

Division of Innovation and Development
Office of Special Education Programs
Office of Special Education and Rehabilitative Services
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INTRODUCTION

Attention deficit disorder (ADD) affects many American school children. It is characterized by inattention and impulsivity and in some cases hyperactivity. Children with ADD do not respond to instructional and management techniques in the same ways as other children. They are often disruptive and are at risk for academic and social failure unless taught appropriately.

Information about educating children with ADD has not been readily available or communicated in a manner that is useful to parents and educators. Therefore, in Fiscal Year 1991, Congress charged the U.S. Department of Education, Office of Special Education Programs (OSEP) with synthesizing and disseminating information on current knowledge about how best to serve children with ADD. In response, OSEP funded four Centers to synthesize the existing research knowledge on assessment and interventions for meeting the needs of children with ADD. These projects were designed to increase the awareness of educators, researchers, and parents on the *research-based interventions and assessment strategies* for children with ADD. The Centers were asked to review existing research across education, psychology, and medicine, and to synthesize it in a manner that would show what is known as well as what is not known about children with ADD. Researchers at each Center conducted extensive literature searches using both automated and traditional search methods. They selected studies for inclusion in their syntheses based on relevance to the topic and quality of the research design. The syntheses generally focused on research conducted since 1980.

The Centers and the topics of their work are as follows:

- **The Arkansas Children's Hospital**: Examined identification and assessment research, with a focus on issues related to assessment instruments.

- **The University of Miami**: Examined identification and assessment research, with attention to issues related to operating within educational systems.

- **The Research Triangle Institute**: Examined intervention research, with a focus on issues related to academic and behavioral interventions.

- **The University of California, Irvine**: Examined intervention research, especially issues of medication.

A fifth Center — **the Federal Resource Center (FRC) at the University of Kentucky** was charged with identifying promising practices and programs for serving students with ADD at the state, district, and local levels. In contrast to the Centers' syntheses of empirical research, the FRC identified promising practices and programs that are *considered by practitioners to be successful* for meeting the needs of children with ADD by conducting a national search for these practices. The five Centers had the further responsibility of disseminating their findings in a manner useful to parents, teachers, and researchers.

Throughout their work, the five Centers have encouraged active participation from such groups as parents, health care professionals, school personnel, researchers, and clinicians. Through meetings and focus groups, these stakeholders assisted Center researchers in identifying the critical issues in teaching children with ADD. To guide their synthesis work, the four research Centers identified six critical issues framed as questions. These questions were:

1. What does the literature suggest concerning numbers and types of children with attention deficit disorder and the implications for their educational needs across the developmental span?

2. What does the literature suggest constitutes an assessment of attention deficit disorder?

3. What does the literature identify as academic and behavioral interventions that work for children with attention deficit disorder?

4. What does the literature suggest about the efficacy of medication for children with attention deficit disorder?

5. According to the research literature, how can educators organize resources and deliver services to best meet the education needs of children with attention deficit disorder?

6. Based on evidence in the research literature, how can parents, educators, and other professionals (including psychologists and physicians) collaborate effectively in identifying and meeting the needs of children with attention deficit disorder?

The research synthesis Center directors determined that sufficient research existed to address only the first four issues. The executive summaries contained in this document provide overviews of the methods and findings of the five Centers. More information about the complete papers can be obtained from Douglas Levin, Chesapeake Institute, Suite 810, 2030 M Street, N.W., Washington, D.C. 20036.

ASSESSMENT

RESEARCH SYNTHESIS ON ASSESSMENT AND CHARACTERISTICS OF CHILDREN WITH ATTENTION DEFICIT DISORDER

EXECUTIVE SUMMARY

ROSCOE A. DYKMAN, PEGGY T. ACKERMAN, AND THOMAS J. RANEY

Introduction

The Arkansas Children's Hospital Research Center, Department of Pediatrics was one of two research centers established to review the literature on assessment of children with attention deficit disorder (ADD), in order to help parents, educators, and clinicians understand and appropriately diagnosis this condition.

Methodology

The Arkansas research team first organized a series of three meetings in the state to develop a list of critical issues of concern to parents, teachers, and clinicians. One of these meetings was held in a relatively poor, rural area of Arkansas, while the others took place in metropolitan Little Rock. All three meetings involved parents of children with ADD, school teachers, school administrators, school psychologists, and family physicians. Topics of interest to participants included:

- History of the concept of ADD, and its relation to attention deficit hyperactivity disorder (ADHD) and to the earlier Minimal Brain Dysfunction (MBD) construct;
- Different definitions of ADD, which include all those in the present psychiatric diagnostic manuals;
- Epidemiology, or incidence of ADD in the population, and how it varies as a function of types of surveys, definitions, and groups studied;
- Etiology, or probable causes of ADD, which considers both environmental and genetic causes as well as their interaction;

- Conditions co-occurring with ADD, such as oppositional-defiant, conduct, anxiety, and mood disorders;
- Biological associates of ADD, such as biochemical and neurological abnormalities, that are more objective bases for placing children on medication;
- Experimental psychological approaches to the study of ADD. Empirical support for the assumption that the basic problems of these children are hyperactivity, inattention, and impulsivity;
- Rating scales that reliably assess ADD;
- Structured interviews that can be administered by lay persons or professionals, and their value in diagnosis; and
- Objective tests that are useful in delineating the characteristics of children with ADD, in recommending remedial work, and in determining whether the children also have a specific learning disability (LD).

To help expand and address this list of critical issues, the Arkansas research team surveyed the literature on assessment published in the last 10 years. To date, their data base system contains some 1,400 references, which they have coded and reviewed in order to extract state-of-the-art knowledge on these topics regarding the assessment of ADD.

Findings

Findings on each of the 10 research topics are summarized below.

History of ADD

Although the label for the disorder has changed from Minimal Brain Dysfunction (MBD) in the 1960s and 1970s to Attention Deficit Disorder (ADD) today, many of the disorder's defining characteristics and hypothesized explanations have endured. However, a considerable amount of disagreement concerning the meaning and validity of the disorder remains. Researchers on MBD were clearly writing about issues which later became translated into ADD or ADHD: namely, problems of attention, impulsivity, hyperactivity, and working memory.

Explanations for the disorder that were and still are hypothesized include: (1) defects having to do with the ability to receive, hold, scan, and selectively screen out stimuli in a sequential order; (2) deficits of the central nervous system, and more specifically, some lack of inhibitory controls for ADD with hyperactivity; (3) a specific learning disability with the cardinal symptom of defective attention; and (4) problems of motivation or intention, such that problems with sustaining attention are exhibited only under some conditions. Researchers also continue to recognize a considerable overlap of LD and ADD and acknowledge that children with ADD can have other co-occurring conditions or diagnoses. In short, nearly all the complaints and uncertainties associated with the MBD concept are also present with its replacement — ADD.

Definitions

Until DSM-IV[1] criteria are finalized and gain acceptance, it seems best to diagnose children with ADD in much the same way as they are defined in DSM-III-R, recognizing that many of these children will have other diagnoses, mainly conduct/oppositional disorders, anxiety disorders including separation anxiety and depression. The Arkansas researchers recommend the DSM-III-R criteria as a first stage screening process, because the criteria identify a heterogeneous sample, which can then be further refined into homogeneous subtypes — e.g., with or without hyperactivity, with or without aggression, and with or without specific cognitive defects — providing one does not adhere rigidly to the criterion that 8 of 10 symptoms listed must be present to make a diagnosis of ADD. Moreover, they believe that the diagnosis of ADD should be restricted to children with IQs above 70 who have no definable neurological disease (although

[1]The purpose of the Diagnostic and Statistical Manual of Mental Disorders (DSM) of the American Psychiatric Association is to provide clear descriptions of diagnostic categories in order to enable clinicians and investigators to diagnose, communicate about, study, and treat various mental disorders. DSM-III-R is currently the most recent revision, however, publication of DSM-IV is expected in 1994.

nearly all will have soft and even some hard neurological signs[2]) and who are not schizophrenic or autistic.

Epidemiology

Shaywitz and Shaywitz (1992) state that ADD is now recognized as the most common neurobehavioral disorder of children. Their estimates for ADD with or without hyperactivity range from 10 to 20 percent of all children. Shekim et. al. (1990) state that symptoms of ADD persist into adulthood in one-third to one-half of all subjects receiving this diagnosis in childhood. And, according to the same article, the overwhelming majority of adult subjects have some other co-occurring diagnosis.

However, it is clear that the number of children that are classified as having ADD is related to the stringency of definitional criteria. There is an inverse relationship between prevalence and the severity of restrictive diagnostic criteria. Moreover, the problem of how to diagnose children with ADD living in poverty or near poverty has not been solved. Finally, good epidemiological studies of distribution of the disorder by social class, sex, and urban-rural samples are missing.

Etiology

Considering the heterogeneity of the ADD disorder, the most likely mode of transmission, or causation, is that of major gene inheritance. Impulsivity and inattention seem to be separate traits, each shaped separately by one, or at most, a few major genes. But since the traits of impulsivity and hyperactivity tend to occur together, it is possible that they depend upon exactly the same genes. Attentiveness also seems to be relatively independent of hyperactivity. The

[2]There is no sharp distinction between soft and hard signs except that, in general, hard signs are those that are known to occur in well-defined neurological diseases.

researchers emphasize, however, that these conclusions are speculative; the mode of inheritance is unknown.

There are many environmental factors that play a role in shaping inherited predispositions, and some of these, such as lead poisoning or alcohol consumption by a pregnant mother, may mimic the effects of genetic inheritance. There has been no support, however, for the hypotheses that food additives or sugar cause hyperactivity in children. The family literature reviewed suggests that family factors do contribute to the severity of symptoms, and that the way parents, siblings, and teachers interact with their children with ADD plays a role in shaping their behavior, without being a primary cause of the disorder.

Biological Theories of ADD

Although sufficient research is lacking in this area, there is compelling evidence that ADD is a biologically-based disorder, whether the ultimate causes are genetic or environmental. Evidence from research on neurological modeling and brain anatomy, neurotransmitter deficiencies, cerebral blood flow, brain imaging, and performance on neuropsychological and neurophysiological tests all suggest that children with ADD differ from normal age-matched controls in a variety of measures of brain functioning. These include neurotransmitter levels and a number of autonomic measures assessing arousal and attention. However, it is not clear that these measures separate children with ADD with and without learning disabilities, which supports the behavioral literature showing that there is a considerable overlap of characteristics.

Experimental Approaches to ADD

A number of studies, though not all, have questioned the notion that the central problem of hyperactive children is a defect in sustained attention. Other studies suggest that subjects with ADD show deficient inhibitory control. However, Milich and Kramer (1984) conclude that in order to identify impulsive response styles, subjects should perhaps be encouraged to disinhibit

rather than inhibit behavior. Zentall's studies (1983, 1986, 1987, 1988) on the "optimal stimulation theory" suggest that hyperactive children are less tolerant of lower levels of arousal than n n-hyperactive children and that they should derive greater gains from stimulation added to repetitive tasks than comparison children. The Arkansas researchers propose that future experimental studies should focus more attention on comparing children with ADD with other clinical groups than with normal controls. A very important issue is whether laboratory tests can be developed that will differentiate children with ADD with a reading disorder (RD) from those with ADD or RD alone.

Conditions Co-occurring with ADD

The literature mentions significant overlap of ADD with learning disabilities, and it appears that some of the same biological factors that produce ADD may also affect reading and spelling. ADD has been found to co-occur with virtually every childhood/youth disorder, including mental retardation, substance abuse, Tourette's syndrome, and conduct, oppositional, mood, anxiety, borderline personality, and learning disorders. Because all of these conditions tend to be familial, it is possible that subtypes of ADD can be defined on the basis of patterns of co-occurrence.

However, the bulk of the literature supports the idea that ADD is independent of other disorders, although the symptoms of ADD are often found in other disorders. Most studies of children with ADD do exclude those with very low IQs and pervasive developmental disorders. In general, the evidence on co-occurrence supports the following conclusions:

- Externalizing psychiatric conditions are more likely to occur in hyperactive subjects with ADD than in nonhyperactive subjects with ADD;
- Internalizing psychiatric conditions are more likely to occur in nonhyperactive subjects with ADD than in hyperactive subjects with ADD;

- Subjects with severe ADD tend to be younger at referral and to have lower IQs than subjects who have only conduct or anxiety disorders;
- Many of the differences reported between subjects with ADD with different co-occurring psychological disorders would disappear if there were adequate controls of both age and IQ;
- While conduct disorder frequently co-occurs with ADD, the diagnosis of conduct disorder is not any more reliable than that of ADD;
- While conduct disorder occurs quite frequently with ADD, it is a separate disorder from ADD; and
- While anxiety disorders coexist with ADD, it is probably wrong to think of ADD as secondary to, or caused by anxiety or depression.

Rating Scales

The Arkansas research team was able to identify 42 rating scales that have been used to describe or diagnose ADD. All of these provide norms of one kind or another and all cite measures of reliability and validity (See Table 1). Barkley, in his 1990 book, outlines the most important properties of rating scales, including length, form, reliability, and various kinds of validity. Ideally, a rating form should be as brief as possible if one wants to obtain the cooperation of teachers. However, reliability is dependent, in part, on the number of items in a scale, and one must be a bit suspicious of scales which claim substantial reliability with only four or five items assessing impulsivity or hyperactivity.

Barkley states unequivocally that rating scales offer numerous advantages over other methods of assessment. Among the advantages mentioned, the following are particularly important:

- Rating scales allow one to obtain information from raters who have had many years of experience with children with ADD;
- They permit data collection on infrequently occurring behaviors that are likely to be missed by observational measures; and
- They are cost effective and require little time to complete.

TABLE 1

Attention Deficit Disorder Rating Scales

Test Name and Developer	Normative Data Available	Domains Assessed
Academic Performance Rating Scale (DuPaul, George J.; Rapport, Mark D.; Perriello, Lucy M., 1991)	n=247 (grades 1-6)	Learning Ability, Academic Performance, Impulse Control, Social Withdrawal
ADD-H Comprehensive Teacher Rating Scale (Ullmann, R. K.; Sleator, E. K.; Sprague, R. L., 1984)	n=1347 (5-12 years)	Oppositional Behavior, Attention, Hyperactivity, Social Problems
ADHD Rating Scale (DuPaul, G. J., 1990)	n=765 for parents, n=551 for teachers (6-12 years)	Inattention-Restlessness, Impulsivity-Hyperactivity
Behavior and Temperament Survey-Home Version (Lambert, N. M.; Hartsough, C.S., 1987)	n=210 (6-11 years)	Hyperactivity, Inattention, Conduct Disorder, Impulsivity
Attention Deficit Disorders Evaluation Scale - Home Version (McCarney, Stephen B., 1989)	n=1754 (4-20 years)	Inattention, Impulsivity, Hyperactivity
Attention Deficit Disorders Evaluation Scale - Teacher Version (McCarney, Stephen B., 1989)	n=4876 (4-20 years)	Inattention, Impulsivity, Hyperactivity
Behavior Assessment System for Children- Parent Rating Scales (Reynolds, Cecil R.; Kamphaus, Randy W., 1992)	n's= 333, 1259, 809 (4-5, 6-11, 12-18 years)	Adaptability, Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Leadership, Learning Problems, Social Skills, Somatization, Study Skills, Withdrawal
Behavior Assessment System for Children- Teacher Rating Scales (Reynolds, Cecil R.; Kamphaus, Randy W., 1992)	n's= 309, 2084, 1090 (4-5, 6-11, 12-18 years)	Adaptability, Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Leadership, Learning Problems, Social Skills, Somatization, Study Skills, Withdrawal
Behavior Assessment System for Children- Self-Report of Personality (Reynolds, Cecil R.; Kamphaus, Randy W., 1992)	n's= 5413, 4448 (6-11, 12-18 years)	Anxiety, Attitude to School, Attitude to Teachers, Atypicality, Depression, Interpersonal Relations, Locus of Control, Relations with Parents, Self-Esteem, Self-Reliance, Sensation Seeking, Sense of Inadequacy, Social Stress, Somatization
Original Behavior Problem Checklist (Quay, H. C.; Peterson, D. R., 1975)	(5-13 years)	Conduct Problems, Personality Problems, Inadequate-Immature, Socialized Delinquency

TABLE 1 (Continued)

Attention Deficit Disorder Rating Scales

Test Name and Developer	Normative Data Available	Domains Assessed
Revised Behavior Problem Checklist (Quay, H. C.; Peterson, D. R., 1983)	(5-17 years; for teachers and mothers)	Conduct Disorder, Socialized Aggression, Attention Problems-Immaturity, Anxiety-Withdrawal, Psychotic Behavior, Motor Tension Excess
Child Attention Problems by Craig S. Edelbrock, Ph.D. (Barkley, Russell A., 1988)	n=1100 (6-16 years)	Inattention, Overactivity
Child Behavior Checklist/2-3 (Achenbach, T. M., 1991)	n=368 (2-3 years)	Withdrawn, Anxious/Depressed, Sleep Problems, Somatic Problems, Aggressive Behavior, Destructive Behavior, Internalizing, Externalizing
Child Behavior Checklist/4-11 (Achenbach, T. M., 1991)	n=2368 (4-18 years)	Social Activities, School Activities, Withdrawn, Anxious/Depressed, Somatic Problems, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, Aggressive Behavior, Internalizing, Externalizing
Teacher's Report Form (Achenbach, T. M., 1991)	n=1391 (5-18 years)	Academic Performance, Working Hard, Behaving Appropriately, Learning, Happy, Withdrawn, Anxious/Depressed, Somatic Problems, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, Aggressive Behavior, Internalizing, Externalizing
Youth Self-Report (Achenbach, T. M., 1991)	n=1315 (11-18 years)	Social, Activities, Withdrawn, Anxious/Depressed, Somatic Problems, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, Aggressive Behavior, Internalizing, Externalizing
Children's Behavior Questionnaire (Rutter, Michael, 1967)	n=479 (7-13 years)	Aggressive-Antisocial, Anxious-Fearful, Hyperactivity
Conners Parent Rating Scale-revised (PQ-48) by C. Keith Conners, Ph.D. (Goyette, C. H.; Conners, C. K.; Ulrich, R. F., 1978)	n=570 (3-17 years)	Conduct Problems, Learning Problems, Psychosomatic, Impulsive-Hyperactive, Anxiety

TABLE 1 (Continued)

Attention Deficit Disorder Rating Scales

Test Name and Developer	Normative Data Available	Domains Assessed
Original Conners Parent Rating Scale (PQ-93) (Conners, C. K., 1970)	n=683 (6-14 years)	Conduct Disorder, Fearful-Anxious, Restless-Disorganized, Learning Problem-Immature, Psychosomatic, Obsessional, Antisocial, Hyperactive-Immature
Conners Teacher Rating Scale-revised (TQ-28) by C. Keith Conners, Ph.D. (Goyette, C. H.; Conners, C. K.; Ulrich, R. F., 1978)	n=383 (3-17 years)	Conduct Problems, Hyperactive, Inattentive-Passive
Original Conners Teacher Rating Scale (TQ-39) (Conners, C. K., 1969)	n=103 (4-12 years)	Hyperactivity, Conduct Problem, Emotional-Overindulgent, Anxious-Passive, Asocial, Daydreams/ Attendance Problem
Conners Abbreviated Symptom Questionnaire- Parent version by C. Keith Conners, Ph.D. (Goyette, C. H.; Conners, C. K.; Ulrich, R. F., 1978)	n=570 (3-17 years)	Not Factor-analyzed
Conners Abbreviated Symptom Questionnaire- Teacher version by C. Keith Conners, Ph.D. (Goyette, C. H.; Conners, C. K.; Ulrich, R. F., 1978)	n=383 (3-17 years)	Hyperactivity, Conduct Problems
Iowa Conners Teacher Rating Scale (Loney, J.; Milich, R., 1982)	n=608 (grades 1-5)	Inattention/Overactivity, Aggression
Cooper-Farran Behavioral Rating Scales (Cooper, David H.; Farran, Dale C., 1993)	n=1458 (Kindergartners)	Interpersonal Skills: Aggressive, annoying, or disruptive behavior Work-related Skills: Organization, Independence, Remembering and Following Directions, Persistence in Task Completion
Devereux Elementary School Behavior Rating Scale (Spivack, G.; Swift, M. S., 1967)	n= 579 (grades K-6)	Classroom Disturbance, Impatience, Disrespect-Defiance, External Blame, Achievement, Anxiety, External Reliance, Comprehension, Inattentive-Withdrawn, Irrelevant Responsiveness, Creative Initiative, Need for Closeness to Teacher
Disruptive Behavior Disorders (Pelham, W.E.; Gnagy, E.M.; Greenslade, K.E.; Milich, R., 1992)	n's= 154, 369, 279 and 129 (5-6, 7-8, 9-10, 11-14 years)	Oppositional/Defiant, Inattention, Impulsivity/Overactivity

TABLE 1 (Continued)

Attention Deficit Disorder Rating Scales

Test Name and Developer	Normative Data Available	Domains Assessed
Eyberg Child Behavior Inventory (Eyberg, S.M., 1980)	n's=512 and 102 (2-7 and 13-16 years)	Conduct Problems/Oppositional Behavior
Home Situations Questionnaire (Barkley, R. A., 1987)	n=1060 (4-16 years)	Social Interaction, Oppositional-Unfocused, Oppositional-Focused, Self-engaged Situations
Home Situations Questionnaire-revised (DuPaul, G. J., 1990)	n=581 (6-12 years)	Self-Care/Public Settings, Chore/Social Settings
School Situations Questionnaire (Barkley, R. A., 1987)	n=615 (4-11 years)	Social Interaction, Focused Attention, Novel Activities Situations.
School Situations Questionnaire-revised (DuPaul, G. J., 1990)	n=490 (6-12 years)	Not yet determined
Groningen Behavior Observation Scale (1991) by W. Vaessen and J.J. Van der Meere	n=436 for teachers, n= 220 for parents	Activity, Attention, Impulsivity, Rapidly Changing Task Orientation, Talkativeness
Illinois Classroom Assessment Profile (Porges, Stephen W.; et al, 1985)	n=707 (grades 2-3)	Conduct Disorder, Ability to Concentrate, Coordination, Evaluation Anxiety, Impulsivity
Louisville Behavior Checklist-E1 (Miller, L.C, 1984)	n=289 (4-6 years)	Infantile Aggression, Hyperactivity, Antisocial Behavior, Social Withdrawal, Sensitivity, Fear, Intellectual Deficit, Immaturity, Aggression, Inhibition, Cognitive Disability
Louisville Behavior Checklist-E2 (Miller, L.C, 1984)	n=236 (7-13 years)	Infantile Aggression, Hyperactivity, Antisocial Behavior, Social Withdrawal, Sensitivity, Fear, Academic Disability, Immaturity, Aggression, Inhibition, Learning Disability
Multi-grade Inventory for Teachers (Agronin, Marc E.; Holahan, John M.; Shaywitz, Bennett A.; Shaywitz, Sally E., 1992)	n=445 (grades K-5)	Academics, Language, Dexterity, Attention, Activity, Behavior

TABLE 1 (Continued)

Attention Deficit Disorder Rating Scales

Test Name and Developer	Normative Data Available	Domains Assessed
Personality Inventory for Children (Lachar, D., 1982)	n=2390 (6-12 years)	Undisciplined/Poor Self-Control, Social Incompetence, Internalization/Somatic Symptoms, Cognitive Development
Preschool Behavior Questionnaire (Behar, L.; Stringfield, S., 1974)	n=496 (3-6 years, teacher ratings)	Hostile-Aggressive, Anxious, Hyperactive-Distractible
School Social Behavior Scales (Merrell, Kenneth W., 1993)	n=1858 (grades K-12)	Social Competence: Interpersonal Skills, Self-Management Skills, Academic Skills; Antisocial Behavior: Hostile-Irritable, Antisocial-Aggressive, Disruptive-Demanding
Self-Control Rating Scale (Kendall, P. C.; Wilcox, L.E., 1979)	n=110 (8-11 years, teacher ratings)	Self-Control Behavior
Swanson, Nolan, and Pelham Rating Scale (SNAP) (Swanson, J.M.; Pelham, W., 1988)	n=986 (6-11 years)	Inattention, Hyperactivity, Impulsivity, Peer Problems
CLAM (Swanson, J.M. 1992)	Sample size not stated (6-7, 8-9, 10-11)	Inattention, Overactivity, Aggression, Defiance.
SCLAM (Swanson, J.M., 1992)	Sample size not stated (6-11)	Inattention, Overactivity, Aggression, Defiance, Peer Interaction
Yale Children's Inventory (Shaywitz, Sally E.; et al, 1986)	n=260 (8-14 years)	Attention, Habituation, Hyperactivity, Tractability, Impulsivity, Negative Affect, Conduct disorder-socialized, Conduct disorder-aggressive, Academic, Fine motor ability, Language
Werry-Weiss-Peters Activity Rating Scale (Werry, J.S.; Sprague, R.L., 1970)	n=140 (1-9 years)	Television, Bedtime/Sleep, Mealtime, Play Behaviors, Restlessness

The best rating scales provide extensive normative data that enable the user to score the statistical deviance of the ratings; that is, to score a subject's relative position in the age and sex group which was used to compile the test norms.

Of all the new instruments on the market to assess ADD, the Behavior Assessment System for Children (BASC) and the Attention Deficit Disorder Evaluation Scale (ADDES) seem to be the best. Unfortunately, however, there is not yet any empirical research in which these two sets of scales have been used. The only other rating scales with comparable norms as these two sets are the Achenbach scales, which have been in use much longer, and have the substantial advantage of having been used in a relatively large number of studies of ADD. None of the scales, however, has been used as frequently as the Conners scales in ADD research, and most newer scales contain Conners' original items in one form or another.

A limitation of both the BASC and Achenbach scales is their length. Most teachers would probably prefer to use the Abbreviated Conners Teacher Rating Form (10 items), or the ADHD rating scale of DuPaul. Therefore, these would seem to be the best to use as first-stage instruments in making an ADD diagnosis. For the purpose of obtaining a better description of the individual child, however, the BASC, Achenbach, or longer Conners forms should be used. If DSM-III-R psychiatric diagnoses other than ADD are to be assessed, the Arkansas researchers recommend the use of diagnostic structured interviews.

Structured Interviews

The Arkansas team identified nine major structured interviews for children with ADD (See Table 2). In general, structured interviews are somewhat less reliable than other assessment methods, such as psychological testing and behavioral ratings. Their value is that: (1) they cover a broad range of childhood psychopathology; (2) they are useful in confirming criteria for ADD; and (3) most importantly, they are invaluable in pinpointing comorbid conditions associated with ADD.

TABLE 2

Attention Deficit Disorder Interview Schedules

Interview Name	Developer	Domains Assessed/Diagnosed
Behavior Screening Questionnaire (BSQ)	Richman, N.; Graham, P., 1971	health, behavior, and development of the child
Child Assessment Schedule (CAS)	Hodges, Kay; McKnew, Donald; Cytryn, Leon; Stern, Linda; Kline, Jeffrey, 1982	Content Area: School, Friends, Activities, Family, Fears, Worries, Self-Image, Mood, Somatic Concerns, Expressions of Anger, Thought Disorder. Symptom Complexes: Attention Deficit with Hyperactivity, Attention Deficit without Hyperactivity, Undersocialized Conduct-Aggressive, Undersocialized Conduct-Unaggressive, Socialized Conduct, Separation Anxiety, Overanxious, Oppositional, Depression
Child Screening Inventory (CSI)	Langner, T.; Gersten, J.; McCarthy, E. D.; Eisenberg, J. G.; Greene, E. L.; Herson, J. H.; Jameson, J. D., 1976	Self-Destructive Tendencies, Mentation Problems, Confiict with Parents, Regressive Anxiety, Fighting, Delinquency, Isolation
Diagnostic Interview for Children and Adolescents-Revised-Adolescent Version (DICA-R-A)	Reich, Wendy; Shayka, Joseph; Taibleson, Charlotte, 1991	Age: 13-17 years Demographics, Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Substance Abuse, Mood Disorders, Anxiety Disorders, Eating Disorder, Elimination Disorders, Gender Identity Disorder, Somatization
Diagnostic Interview for Children and Adolescents-Revised-Child Version (DICA-R-C)	Reich, Wendy; Shayka, Joseph; Taibleson, Charlotte, 1991	Age: 6-12 years Demographics, Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Substance Abuse, Mood Disorders, Anxiety Disorders, Elimination Disorders, Gender Identity Disorder, Somatization
Diagnostic Interview for Children and Adolescents-Revised-Parent Version (DICA-R-P)	Reich, Wendy; Shayka, Joseph; Taibleson, Charlotte, 1991	Demographics, Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Substance Abuse, Mood Disorders, Anxiety Disorders, Elimination Disorders, Gender Identity Disorder, Somatization
Diagnostic Interview Schedule for Children-Child Interview (DISC-C)	Costello, A. J.; Edelbrock, C. S.; Kalas, R.; Kessler, M.; Klaric, S., 1982	*Behavior/conduct* Conduct Disorder: Aggressive, Nonaggressive, Oppositional; Attention Deficits: Inattention, Impulsivity, Overactivity; *Affective/neurotic* Anxiety: Separation Anxiety, Overanxiety; Fears and Phobias: Simple Fears, Social Phobias; Obsessive-compulsive; Schizoid/psychotic; Affective: Affective Depression, Cognitive Depression, Vegetative Depression, Suicidal Depression

TABLE 2 (Continued)

Attention Deficit Disorder Interview Schedules

Interview Name	Developer	Domains Assessed/Diagnosed
Diagnostic Interview Schedule for Children-Parent Interview (DISC-P)	Costello, A. J.; Edelbrock, C. S.; Kalas, R.; Kessler, M.; Klaric, S., 1982	*Behavior/conduct* Conduct Disorder: Aggressive, Nonaggressive, Oppositional; Attention Deficits: Inattention, Impulsivity, Overactivity; *Affective/neurotic* Anxiety: Separation Anxiety, Overanxiety; Fears and Phobias: Simple Fears, Social Phobias; Obsessive-compulsive; Schizoid/psychotic; Affective: Affective Depression, Cognitive Depression, Vegetative Depression, Suicidal Depression
Interview Schedule for Children	Kovacs, M., 1982	DSM-III diagnoses, especially affective disorders in childhood, and includes diagnostic addenda for diagnoses such as overanxious disorder and attention deficit disorder.
Mental Health Assessment Form (MHAF)	Kestenbaum, Clarice J.; Bird, Hector R., 1978	Physical Appearance, Motoric Behavior and Speech, Relatedness during Interview, Affect, Language and Thinking, Feeling States, Interpersonal Relations, Symbolic Representations, Self-Concept, Conscience- Moral Judgement, General Level of Adaptation
Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) (1986 revision)	Last, Cynthia, 1986 (adapted from Puigh-Antich and Ryan, 1986 revision)	Major Depression and Dysthymia, Mania and Cyclothymic, Anxiety Disorders, Separation Anxiety Disorder, Phobic Disorders, Overanxious Disorder, Obsessive-Compulsive, Avoidant Disorder, Somatization, Disruptive Behavior Disorders, Psychotic Symptomatology,
Semi-structured Clinical Interview for Children (SCIC)	Achenbach, T. M.; McConaughy, S. H., 1989	Inept, Unpopular, Anxious, Withdrawn-Depressed, Inattentive-Hyperactive, Resistant, Family Problems, and Aggressive.

Four interview schedules can be recommended for specialized purposes. The Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) and the Interview Schedule for Children were developed to select subjects for research on child depression. Their symptom coverage is much more comprehensive in the area of affective disorders than in other disorders. The Diagnostic Interview for Children and Adolescents (DICA) and the Diagnostic Interview Schedule for Children (DISC) are highly structured diagnostic interviews designed

primarily to screen and identify nonreferred children at risk for psychiatric disorder and for producing "best estimate" diagnoses in survey studies. They do not have a particular diagnostic focus, but cover an extremely broad range of child behaviors and symptoms. Various versions of the DISC have been used in field trials to establish the revised definitions of ADD which will appear in DSM-IV.

Assessment Methods

In general, the Arkansas researchers support the recommendations of the Professional Group for Attention-Related Disorders (PGARD), as cited in the Children with Attention Deficit Disorder (CHADD) *Educators Manual*, that propose a two-tier assessment process. Tier one involves a comprehensive interview with past and present caretakers and teachers to assess the existence of symptoms of ADD in different environments and to obtain medical information that might be associated with ADD. Tier two involves assessing classroom behavior (direct observation over several days by someone other than the teacher) and, academic productivity relative to a child's IQ (percentage of work completed and percentage completed correctly during written assignments over two weeks). Tier two also involves the administration of standard psychoeducational tests that, among other things, help identify learning problems.

In the first stage of the assessment process, the child suspected of having ADD should be referred to a child specialist (school counselor, school examiner, psychological examiner, pediatrician, psychologist, child psychiatrist) for a thorough clinical evaluation. Any tentative clinical diagnosis made by the child specialist should be backed up with a detailed family and developmental history.

To assess the presence of ADHD, parents and teachers should be asked to complete DuPaul's ADHD rating scale. Specialists should note whether the problems lie in the area of

inattention, restlessness or impulsivity, or hyperactivity. An assessment of hypoactivity, passivity, or inhibitory behavior should also be made.

Next, the child specialist should obtain more detailed ratings of parents and teachers using either the Achenbach CBCL, the BASC, or the Conners PQ-93 and TQ-93. If these more detailed reports confirm first stage diagnostic impressions, structured psychiatric interviews should be completed, using both self-report and parent forms. Associated psychological disorders that are identified should be classified as: (1) conduct/oppositional; (2) emotional (either depressed or anxious); (3) both (1) and (2); or (4) neither (1) nor (2).

At this stage, the child should also be given individually administered intelligence and achievement tests to assess intellectual functioning and test for the possibility of learning disabilities. In addition, many writers believe that frontal lobe brain functions play a very important role in ADD behavior, and these are best assessed by neuropsychological tests that examine "executive functioning", such as planning, impulse control, sustained attention, and working memory. Finally, there is good reason to administer neurological examinations, since a number of studies suggest that children with ADD or LD have a large number of soft or hard neurological signs that point to neurological defects relative to normal control children.

Once all assessments have been performed, all those involved in their administration (including parents, teachers, and child specialists) should meet to evaluate the results. Whether a diagnostic label is or is not assigned to the child will depend upon whether such a label is necessary for reporting purposes or to obtain help for the child. What is important is to: (1) describe the child's problems; (2) identify the areas in which he/she is different from his/her peers; and (3) formulate a treatment plan which directly deals with the child's characteristics and problems. Such a treatment plan might include:

- Extra attention in a regular classroom;

- Time spent in a remedial classroom;
- Referral to a tutoring program outside of school;
- Referral to a pediatrician or child psychiatrist for medication; and
- Referral to a child psychologist or psychiatrist for individual or family therapy.

Conclusion

The researchers found that ADD as now defined contains many of the symptoms previously described as minimal brain disfunction. The DSM-III-R definition is still a valid one for diagnosis of ADD. ADD is the most common neurobehavioral disorder of children, affecting 10 to 20 percent. There appears to be a major genetic component to ADD, although environmental and prenatal factors can also produce its characteristics. A variety of conditions co-occur with ADD although it appears to be independent of other disorders.

A large number of rating scales, tests and interviews are available for the diagnosis of ADD. Practitioners should consider their validity, length, form and reliability when selecting instruments. A two-tiered approach to assessment is recommended.

RESEARCH SYNTHESIS ON THE ASSESSMENT AND IDENTIFICATION OF ATTENTION DEFICIT DISORDER

EXECUTIVE SUMMARY

JAMES D. MCKINNEY, MARJORIE MONTAGUE, ANNE M. HOCUTT

Introduction

The University of Miami Center for Synthesis of Research on Attention Deficit Disorder (ADD) undertook the synthesis of the research relevant to the assessment and identification of children with ADD as it relates to operating within educational systems. Their synthesis was based on literature published between 1980 and 1992.

Methodology

The goal of the Miami Center was to develop a "reasonably exhaustive" and representative data base of original research articles. Since contemporary views and debate on the definition of ADD followed the publication of DSM-III in 1980 and its revision, the Miami researchers elected to exclude (for the most part) pre-1980 publications.

The center's approach was to start with articles and reports referenced in extant bibliographies of major researchers' works. Additionally, center researchers conducted computer searches and index searches and wrote to major authors requesting that they provide articles that were in press. The principal means for deciding what evidence to include in the synthesis, what constitutes best evidence in a given case, and the grouping of studies with common design features was the use of a coding sheet to classify and describe the quality of evidence offered by each study reviewed.

The Miami researchers reviewed more than 1,300 articles relevant to assessment and identification of children and youth with ADD. (Only a minor proportion — approximately 11

percent — of these articles were located in educational publications.) The final synthesis included only a sample of the 1,300 studies. The researchers selected studies for inclusion based on their quality and relevance. The definition of quality used implies that the design of the study was appropriate for the question(s) being asked, the sample was of adequate size for the design and analysis, the dependent measures were reliable, the data analysis strategies were appropriate, and the overall conclusions were warranted. Relevance means that the articles contribute to the weight, degree of replication, and robustness of the evidence. In short, the articles were used to detect emergent themes and patterns of evidence that are replicated with each successive case, building a logical argument for the validity of the conclusions.

Limitations of the Knowledge Base

The generalizability and interpretation of the research on educational characteristics of children with ADD is limited by a number of factors. First, since most of the research was conducted and reported from a mental health perspective and used clinical rather than school-based samples, there is less evidence available than might be expected, given that the initial literature base contained over a thousand articles. Second, ADD was defined and measured in different ways, which generated at least three types of research samples: 1) children who are hyperactive or hyperactive/aggressive, 2) children with and without hyperactivity, and 3) children with the three dimensions of inattention, impulsivity and hyperactivity. Third, some studies failed to account for co-occurring learning disabilities, behavior problems, and various levels of socioeconomic status. Finally, girls were consistently undersampled or not studied at all in the bulk of available studies.

This limits the research base in the following ways. First, information on educational characteristics is rarely reported, which narrows the literature base to about 90 articles. Second, when this literature is narrowed further on the basis of type of educational characteristic and type

of sample, there is very little replication of studies. With these caveats, the following are the Miami researchers' summary findings.

General Conclusions: Educational Characteristics and Assessment

Primary Characteristics and Definitions of ADD

Considerable diagnostic confusion still exists in the American Psychiatric Association's latest version of the Diagnostic and Statistical Manual (DSM-III-R) about the distinction between attention deficit disorder without hyperactivity and attention deficit disorder with hyperactivity (ADHD), as well as the distinctions among ADD, learning disabilities (LD), and disruptive behavior disorders. However, there appears to be considerable consensus that inattention, impulsivity and excessive levels of activity are the essential features of the disorder. Significant deviation from normal children of the same age and gender on measures of these behaviors determine the inclusionary criteria for the disorder (whether children will be included in the group diagnosed as having ADD). There are also significant decisions with respect to exclusionary criteria and severity of the symptoms that must be considered. Finally, the current trend is to place heavy emphasis on the assessment of the disorder in the school setting before a diagnosis of ADD is confirmed.

Inattention and distractibility. Attention is a multidimensional concept that involves alertness, arousal, selectivity, and vigilance, or sustained attention, and it can vary with setting and task demands. Inattention/distractibility, as stated above, is central to the concept of ADD: teachers and parents often complain that children with ADD "don't listen," "can't concentrate," "are easily distracted," "don't finish tasks," "lose things," and "require more than typical supervision."

The type of attention assessed and the situational variability of the attentional process is important to the assessment and identification of children with ADD. For example, while the

research has been contradictory, some studies indicate that the major problem for children with ADD is sustaining attention in boring, repetitive tasks such as unsupervised seatwork and routine chores. On the other hand, some studies show that children with ADD are more distracted by external stimulation than normal children, while others report no effect for extra task stimulation and some report a beneficial effect on task performance.

The importance of improved attention for children with ADD cannot be over-emphasized. Teacher and parent ratings of attention/distractibility and classroom observations of on-task/off-task behavior have been related consistently to individual differences in achievement for general school samples, have been shown to differentiate categories of children with disabilities, and have provided better prediction of academic progress over time than measures of ability for both normal and special education students. Obviously, deficits in attention help explain the poor academic performance of students with ADD.

Finally, it should be noted that theory and research on the role of attentional processes in learning and the regulation of behavior has had a significant impact on research and practice in special education. Problems of inattention combined with poor academic performance constitute the bulk of referrals for evaluation for special education.

Impulsivity and disinhibition. The second major manifestation of ADD is difficulty in inhibiting behavior in response to situational changes in the child's stimulus environment. Inhibition is similar conceptually to selective attention in that it involves the ability to screen out extraneous stimulation. It also involves preventing inappropriate verbal or motor behavior in social contexts (e.g., impulsive responding). Like inattention, impulsivity is multidimensional and is inappropriate relative to a given context.

The particular aspects of impulsivity and situations in which it is displayed remain unclear. However, children with ADD are typically described as "responding quickly without thinking,"

"making many needless or careless errors," "taking unnecessary risks," and "carelessly damaging their own or others' property." Parents and teachers often report that their children with ADD are "accident prone," "start tasks without instruction or supervision," "jump start conversations," "interrupt others," and "blurt out answers - can't wait their turn." The social consequences of such behavior are well known, and many adults and peers regard children with ADD as immature, irresponsible, and rude.

Impulsivity has also been defined as the inability to sustain inhibition, e.g., continued responding when requested to stop, and to delay gratification. The inconsistency of findings in this area may be due to the fact that disinhibition is a central feature of hyperactivity and cannot be untangled operationally as a separate construct. Inattention may be secondary to the primary disorder manifested by children with ADHD, which is viewed as a problem in the regulation and disinhibition of behavior.

Hyperactivity. The third manifestation of ADD is hyperactivity that is excessive and developmentally inappropriate. The most obvious characteristic in educational settings is inappropriate gross motor behavior. Children are perceived as "always on the go," which is displayed by "running around the classroom," "fidgeting," and "twisting and wiggling in one's seat." The behavior has a lack of control quality about it which is apparent to most adults and peers. The principal difference between clinically significant hyperactivity and normal elevated activity is the pervasiveness of the activity across different settings and its appropriateness given the environmental situation. While inattention is sometimes an invisible handicap, hyperactivity is highly visible and disruptive.

Since the relative severity of the ADD symptoms of inattention, impulsivity and hyperactivity can vary among children and since each may impair academic performance and social-emotional functioning in different ways, it is important that all three constructs be

measured. In addition, the literature on the educational characteristics of students with ADD and its co-occurrence with other conditions indicates that the classification of ADD should recognize at least two subtypes: ADD with and without hyperactivity.

General Intelligence

A common finding across studies that compare children with ADD to those in normal comparison groups is that children with ADD score below normal comparison students on individually administered IQ tests. However, the average performance in the majority of studies is still well within the average range between 85 and 115. Although the symptoms of ADD may impair the performance of children on cognitive tasks that require sustained attention and effort, the literature also suggests that the lower IQ scores reported in some studies are due to the failure of researchers to distinguish between children who have ADD only and those who have ADD and learning disabilities. Those studies that have subtyped samples of children with ADD and co-occurring conditions generally indicated that children with ADD and learning disabilities have lower IQs that those who have ADD only. Also, few differences in IQ have been reported between children with ADD and those without hyperactivity in the absence of learning disabilities. In sum, the Miami researchers found no evidence to suggest that children with ADD are impaired intellectually apart from other co-occurring conditions, and lower socioeconomic status (SES) in some samples.

Achievement in Academic Subjects

Surprisingly few studies in the literature report the academic achievement of children in the research samples. Also, scant information is available on the number and relative severity of achievement problems across different academic subjects.

It should be noted that many of the studies reporting achievement for children with ADD did not take IQ, gender, and SES into account. Additionally, many studies did not account for co-

occurring learning disabilities. Consequently, researchers were unable to systematically determine the relationship between academic achievement and other variables such as ADD alone, ADD in combination with LD, and different levels of SES and IQ present in samples of children with ADD.

Speech and Language Problems

The evidence on the prevalence of speech and language problems is inconsistent across studies, but suggests nevertheless that when problems are evident, they are more likely to involve expressive rather than receptive language. The problems in expressive language are seen primarily in dysfluent speech and problems of articulation. While there is little evidence for developmental language delays for children who have ADD only, they may be evident in the history of children with ADD who also have LD.

Functional Outcomes

Follow-up studies of adolescents indicate that, on average, children identified as hyperactive between the ages of four to sixteen were at least three times more likely to be retained in grade and suspended from school than children in normal comparison samples. The numbers of children who were expelled from school or who drop out were generally twice those of normal children. Most of this type of evidence comes from follow-up studies of children identified clinically as hyperactive during childhood and may not reflect the outcomes for children who only have attentional problems. Again, many of these follow-up studies did not consider the effects of co-existing conditions such as LD and conduct problems, which would also predict poor outcomes apart from or combined with ADD.

Special Education Placement

The prevalence of children with ADD who receive special education has not been studied extensively or directly. Researchers found no studies that compared the educational characteristics

of children with ADD who were placed in special education compared to children with and without other types of disabilities.

However, there were several studies of service utilization for children with ADD which indicated that about one-third of children diagnosed as hyperactive received special education services, and another third of those with hyperactivity and co-occurring conditions also received special education. Other studies have shown that placement is related to ADD subtype: for instance, one study reported that 53 percent of children with ADD without hyperactivity were placed in LD programs compared to 34 percent of children with ADD with hyperactivity.

Assessing Co-occurring Disabilities

The research literature on ADD indicates that it can co-occur with learning disabilities in at least ten to twenty percent of cases when stringent identification criteria are applied for both conditions, although the prevalence of co-occurrence varies greatly from nine percent to sixty-three percent across studies. Similarly, consistently high rates of co-occurrence are reported between ADD and disruptive behavior disorders marked by aggression, oppositional-defiant behavior and conduct problems. The evidence for the presence of co-occurring emotional problems is less consistent, but becomes significant for girls with ADD as they approach adolescence. Therefore, if a student is suspected of having ADD, it is reasonable to suspect the student may also have co-occurring LD or emotional/behavior disorder (EBD). This implies that appropriate instruments should be used to include or exclude the presence of these problems as part of a comprehensive assessment strategy.

There is a need to better specify the educational characteristics of students who have only ADD without the complications imposed by other co-existing conditions. In this regard, researchers need to go beyond the ADD literature to apply currently-used methods for assessing educational needs, and in particular instructional needs. The Miami researchers recommend that

curriculum-based measures be used to identify students with ADD who could benefit from accommodations in the general education classroom rather than receiving special education and related services.

Social Adjustment and Adaptation

One of the most consistent findings in the literature on ADD is that the majority of students with ADD have significant and persistent problems in social relationships. Also, evidence suggests that the nature of social problems is related to ADD subtypes such that while children with ADD with hyperactivity are aggressive and rejected more often than normal comparison children, children with ADD without hyperactivity are more withdrawn and unpopular, but not necessarily rejected. The latter description is also similar to that for students with LD. However, with ADD, these findings have been replicated extensively by observation, sociometric techniques, and the opinions of parents, other adults, and peers. Accordingly, it is an area of assessment that would be warranted in many cases.

Sociodemographic Characteristics

The bulk of the research literature that was reviewed consists primarily of comparative studies of children with ADD, normal control groups, and other groups of interest (such as students with different subtypes of ADD or other conditions). Although data on SES, race, and ethnicity may be reported, this is done inconsistently. Even when reported, these data are rarely analyzed. As a result, little is known about variation in the educational characteristics of children with ADD that might be attributed to sociodemographic factors such as mothers' or fathers' educational or socioeconomic status, race, ethnicity, or neighborhood environment.

The available evidence is contradictory; some studies supported the conclusion that hyperactive children are disproportionately found at lower SES levels or found disproportionately to attend "disadvantaged" or lower SES schools. On the other hand, at least two studies have

found no association between ADD and SES, and others have attributed SES effects to factors such as family disorganization and dysfunctionality associated with poverty, economic distress and other family stress and perinatal health problems. Also, most of the perinatal and environmental risk factors associated with ADD are those associated with other conditions which have higher prevalence rates among children reared in poverty and unfavorable home/neighborhood environments.

Multicultural Characteristics

There has been considerable concern among educators, parents, and policy-makers about the over-representation of minority children in special education compared to their representation in the general population. The latest Annual Report to Congress on implementation of the Individuals with Disabilities Education Act (IDEA) indicates that African-American students are twice as likely to be identified as disabled compared to their representation in the general population. Hispanic students are substantially less likely to be identified in most special education categories except "Other Health Impaired" (OHI), in which their representation is disproportionately high. The disproportional representation of African-American students overall and especially in the category of Serious Emotional Disturbance (SED) should be emphasized because of the high rate of co-occurrence between ADD and oppositional/defiant and conduct disorders, which constitute the bulk of problems seen in the SED category. Similarly, the over-representation of Hispanic Americans in the OHI category is of interest because of its availability as a special education option for students with ADD and because the specific nature of the disabilities served in OHI currently are not well documented. Given the relationships between low SES, poverty status, and the prevalence of minority students in particular categories of special education — where students with ADD are likely to be found, there is reason for concern about the potential for over-identification of minority students with ADD.

Unfortunately, the research literature that addresses multicultural issues in the assessment of ADD with large samples is sparse. Although ADD has been studied internationally in both English-speaking and other language countries, this literature is not responsive because different racial/ethnic groups were not directly compared. Clearly, a great deal of additional work is needed in this area.

Defining the Severity of ADD

DSM diagnosis of ADD is based on the number of symptoms presented that exceed a specified threshold, and severity is assessed rather subjectively. Instruments keyed to DSM-III and III-R have the advantage of assessing the severity of symptoms more objectively in terms of the number that exceed the required threshold, as well as overall severity based on average ratings. On the other hand, these instruments have less extensive norms compared to most empirically derived instruments that assess a broader range of child psychopathology (but that do not always measure all of the three primary characteristics of ADD or measure them neatly apart from other types of problem behaviors.) These broader instruments can therefore tend to contaminate inattention with passivity or immaturity and hyperactivity with aggression or defiant behavior.

In general, the recommended solution to this problem is to seek confirmatory evidence for the diagnosis of ADD from DSM-keyed instruments by using multifactor instruments which are relevant to ADD and can be used to assess co-occurring emotional and behavioral problems.

Duration of Symptoms

ADD is viewed as a pervasive disorder that appears early in childhood and persists into adult life. The Miami researchers' review of the preschool literature suggests that ADD with hyperactivity as the major symptom along with aggressive or oppositional behavior can be identified as early as three years, and these symptoms persist reliably in a significant number of

cases well into the elementary grades. However, attentional problems are less visible than activity and impulsivity control problems and are typically recognized by teachers during the primary period (K-3). DSM-III-R establishes the age of onset of ADD at seven years and requires evidence of persistence for at least six months. The collection of parent and teacher interview data along with a thorough review of school records and treatment history are very important with respect to these criteria.

Situational and Temporal Variability

This problem in assessment is related to the previous problem in that evidence of pervasiveness is needed to show that inattention, impulsiveness, and hyperactivity are not specific to certain situations (e.g., displayed in school but not at home, or only in some school or home situations). There are essentially two assessment strategies for addressing this problem. First, instruments are available for collecting ratings of the severity of ADD symptoms in different school and home situations. However, there is a paucity of evidence on the effects of ADD symptoms on the performance of specific instructional activities and in different instructional contexts. Observational instruments for assessing ADD symptoms and, more generally, on- and off-task behavior are very suited for this purpose. They also help to guide educational planning with respect to the scheduling of learning activities over the school day and anticipating what instructional methods and behavior modification techniques are most appropriate. Finally, they help to monitor the effectiveness of instructional and behavioral accommodations. Parent interviews can also reveal how ADD is expressed in the home and community, not only for diagnostic purposes, but also as a means for working with parents to support school-based interventions. In this regard, the interview is an opportunity to gain rapport with parents by communicating the school's concern for their problems at home as well as those that may be

evident in school, and thereby promote more constructive involvement of parents in supporting their children's educational program.

Conclusion

In summary, the Miami researchers noted some issues concerning educational assessment that are unresolved by the current research literature on ADD. Some of these issues reflect the inadequacy of the knowledge base, while others are procedural in nature. First, there is a need to develop consensus on what constitutes a comprehensive assessment of ADD for educational purposes. At present, there is little evidence to define the prevalence and characteristics of children with ADD who would be identified using stringent standards. For that matter, there is little evidence about the number and characteristics of those with ADD who currently receive special education and related services, or about the nature and type of services they receive.

Second, only a small number of studies assessed educationally-relevant variables to describe how inattention, impulsivity, and overactivity impair learning on specific instructional tasks and in different educational settings. Although progress has been made in this area, it is evident that researchers must apply what they know from the literature in general and special education more broadly and to conduct additional research to validate promising approaches to fill the gaps in both basic and applied research on ADD.

Third, existing literature on ADD is not adequate to guide the field with regard to what assessment data is necessary and sufficient to qualify a child with ADD for general education accommodations under Section 504 of the Rehabilitation Act of 1973 as opposed to special education and related services under IDEA. Similarly, the literature is not adequate to provide guidance on the appropriate roles of different types of professionals in the assessment/identification process. In sum, the researchers believe that while further research is

needed on some aspects of assessment, there are also a number of substantive procedural issues to resolve that require ongoing professional dialogue as well.

INTERVENTION

RESEARCH SYNTHESIS ON EDUCATION INTERVENTION FOR STUDENTS WITH ATTENTION DEFICIT DISORDER

EXECUTIVE SUMMARY

THOMAS FIORE

Introduction

The Research Triangle Institute (RTI) Attention Deficit Disorder (ADD) Intervention Center synthesized research on behavioral and educational interventions for children with ADD. Because many of the studies examined were conducted in clinical settings, and it is unclear how well the techniques used will transfer to school settings, the research reviewed by RTI provided few definitive answers about effective interventions. It did, however, suggest areas with potential for further testing and experimentation. The RTI review focuses on seven topics relevant to education. These include: positive reinforcement, behavior reduction, response cost, self-instruction or cognitive-behavioral training, parent or family training, task or environmental stimulation, and biofeedback.

Methodology

First, the RTI Center asked parents, educators, and researchers to identify critical issues in intervention for children with ADD. Though many critical issues were identified, the availability of studies on suggested topics limited the review to the seven topics listed above. It was not possible to conduct a quantitative analysis of effects of treatments because so much variation in treatments and outcome measures existed. Therefore, the Center undertook a qualitative analysis. This approach allowed the researchers to examine trends over time, to explore contradictions in the research, and to consider the limitations of individual studies. They closely examined the study design of existing research, and gave extra weight to studies that:

- used random assignment;
- employed well-designed interventions that could be replicated;
- were set in general and special education classrooms;
- and used teachers or parents as the interveners.

In topic areas with several studies, the reviews sought consensus across the findings. They also noted areas requiring further study.

Positive Reinforcement or Token Reinforcement

Positive reinforcement procedures have been found to increase desirable behaviors under well-regulated conditions. These procedures include such mechanisms as providing tokens or points when children perform desired behaviors such as remaining seated, working on tasks, or being quiet. Studies have found these procedures to reduce activity levels, increase time on-task, and improve academic performance. It was not demonstrated that behaviors learned in one setting transfer to another setting. Some studies found that reinforcing desired behaviors each time they were observed was more effective than reinforcing desired behaviors only part of the time, though other studies found no difference. Overall, positive reinforcement techniques have the advantages of being cost effective, familiar to many educators, relatively easy to implement, and useful in a variety of settings.

The reviewers recommend that simple positive reinforcement of desirable behaviors be the first intervention educators consider when developing programs for students with ADD. Because trained behaviors tend not to generalize, educators should train specific behaviors across settings. Educators should explore the effects of continuous versus partial reinforcement and individual versus group rewards. They should expect to make adjustments for situational and individual differences in children.

Further research is needed to "fine tune" effective positive reinforcement strategies including the effects of delayed reinforcement, the transferability of these approaches to general education classrooms, and the use of these strategies with older children with ADD.

Behavior Reduction Strategies

Behavior reduction strategies include verbal reprimands, negative feedback, or re-direction of behaviors. The reviewers found that mildly aversive procedures can be effective in decreasing undesirable behaviors, either alone or with a reward program. Also, to some extent, they can increase academic productivity. The research on reprimands confirmed that this common classroom technique was effective. Additionally, research on response cost procedures (described below) supports the effectiveness of the use of behavior reduction strategies.

The reviewers suggest that educators explore the use of behavior reduction strategies, by targeting undesirable behaviors, along with positively reinforcing desirable behaviors. They suggest that educators use short, immediate reprimands or verbal re-direction to decrease off-task behavior and avoid longer reprimands.

Additional research on this topic with older students and other forms of behavior reduction would be useful. For example, researchers should test time-out procedures with a focus on identifying features that make time-out maximally effective with this population. Researchers should compare reward-only, punishment-only, and response cost programs to determine the most efficient means of behavior change, especially in general education classrooms.

Response Cost

Response cost procedures combine positive and negative reinforcement by removing tokens that have been earned when children exhibit undesirable behaviors. Response cost interventions are especially effective in improving attention-to-task and completion of academic tasks. Some studies have shown response cost to be as effective as medication or particularly

effective in combination with medication. Commercially available electronic desk-top apparatuses for recording and deleting points make implementation of a response cost program practical in regular classroom settings.

The reviewers suggest educators should view response cost as the most effective behavioral intervention for increasing on-task behavior and as a potentially effective strategy to increase academic productivity, especially for students who do not respond to positive reinforcement or behavior reduction strategies alone. However, its use with secondary students has not been demonstrated. Educators should also explore the use of commercial electronic devices for implementing response cost. Further study is needed with older students and in school settings.

Self-Instruction or Cognitive-Behavioral Training

Cognitive-behavioral therapy combines behavior modification techniques with cognitive strategies designed to directly address impulse control, problem solving, and self-regulation. Cognitive strategies include self-instruction and correspondence training, a form of self-instruction that rewards correspondence between statements and behaviors. Some evidence suggests that cognitive-behavioral therapy may produce improvements in sustained attention and impulse control and reductions in inappropriate behaviors. Most research, however, does not consistently demonstrate enough positive results to recommend the widespread use of this type of therapy, particularly given the relatively high staff investment it requires.

As a result, the reviewers suggest that educators should not commit significant resources to cognitive-behavioral interventions until clinicians or researchers can produce more positive results. Given the technique's intuitive appeal and success with other populations, however, educators might wish to experiment with cognitive-behavioral therapy on a limited basis. Experiments should focus on specific behaviors associated with school problems, and

generalization beyond these behaviors should not be expected. Finally, educators should also explore the use of correspondence training, which initial investigation suggests may be an efficient and practical intervention for use in school settings.

Further research should attempt to determine which components of cognitive-behavioral therapy are effective and whether cognitive-behavioral therapy is more effective with particular subgroups of students, such as preschoolers and adolescents. Additionally, researchers should focus upon implementation of cognitive-behavioral programs in school settings, with educators as the program implementers.

Parent or Family Training

Parent or family training programs, usually designed to extend or enhance treatment, have proven moderately successful. In most studies, the training consists of behavioral modification strategies applied to home problems or designed to support school or clinic-based interventions. Such training is effective in reducing activity level, conflict, and anger intensity and in increasing on-task behavior and compliance. Many studies also report reduced parent stress or improvements in parents' perceptions of the quality of parent-child interactions following parent training. Behavioral parent training is a standard part of interventions using several treatments together. Training is usually provided by clinicians rather than school personnel.

The reviewers suggest educators should consider parent training in addition to school interventions in collaboration with clinicians. While parent training should include information on ADD, the primary emphasis should be on behavioral strategies. Parent training sponsored by educators should focus on improving home-school collaborations such as rewards at home for school performance and techniques to encourage homework completion.

Further study is needed of parent training as a component of multiple treatment interventions, especially its long-term effectiveness and effectiveness with adolescents. Additional

research is also needed on refining strategies to improve generalization of training effects from the home to the classroom.

Task or Environmental Stimulation

Prior environmental stimulation research was based on the theory that students with ADD need minimal, or reduced, stimulation. More recent research, however, has looked at ways to increase the stimulation of materials and instruction. By varying features of instructional activities or materials such as color, presentation rate, and response activity, researchers have demonstrated promising improvement in the performance and behavior of students with ADD.

Reviewers suggest that, especially with rote learning tasks, educators should explore the effectiveness of adding color to instructional materials and increasing their novelty. In planning instruction, educators should also explore the effects of varying rates of presentation and levels of detail on the comprehension of students with ADD. They should also explore ways for students to actively respond during academic tasks and to engage in alternative motor activities.

Researchers should continue to develop, test, and modify instructional materials and techniques in order to provide varying levels and types of stimulation. This research should focus on improving academic achievement as well as task performance and behaviors. Additionally, researchers should study the role that computers and other technologies can play in the education of students with ADD.

Biofeedback

Research in the 1970's and early 1980's found biofeedback and relaxation techniques to benefit children with ADD in clinical settings. Biofeedback is a technique that trains children to consciously control their brainwaves or muscle tension by using an electronic instrument to monitor these functions. The technique also employs relaxation techniques to control these physiological responses. Preliminary results showed broad positive effects, but these were usually

based on extended treatments in clinical settings, sometimes combined with academic tutoring. Relaxation treatments are potentially more promising for practical reasons such as ease of implementation, but they have not been tested in school settings. Overall, compared with biofeedback, other treatments may be equally effective, far more efficient and more appropriate for educators.

The reviewers recommend that educators should be skeptical about generalizing clinical biofeedback treatments to school settings and should not invest significant resources in biofeedback, because these resources can be invested in more effective treatments. Muscle tension feedback may be worth exploring on an experimental basis in well-controlled studies, as it has shown more promise than brain wave feedback.

Any further study on biofeedback should include a cross-section of students. Investigators should focus on procedures that can be implemented in school settings by school personnel within the time and budget constraints schools face.

Conclusion

While several educational techniques (especially positive reinforcement, behavior reduction, response cost, family training, and task simulation) are promising tools for assisting in the education of children with ADD, there were few definitive answers to how best to structure an education intervention. However, several areas for further research and experimentation were identified.

ATTENTION DEFICIT DISORDER: SCHOOL-BASED PRACTICES

EXECUTIVE SUMMARY

BARBARA G. BURCHAM AND LAURANCE B. CARLSON

Introduction

The University of Kentucky's Federal Resource Center (FRC) investigated assessment and educational intervention practices that show promise for enabling educators and parents to meet effectively the special needs of children and youth with attention deficit disorder (ADD) in the school environment.

Methodology

During the first year of the project, knowledgeable stakeholders from five critical groups — parents, school personnel, researchers, health professionals, and family support professionals — guided the FRC's national effort to locate, evaluate, and select promising identification and intervention practices for children with ADD. As criteria for selecting promising practices, the 11-member Core Team of stakeholders determined that both kinds of practices should:

- Have a positive impact on the child with ADD or the family;
- Have practical application or educational relevance for the child or the family;
- Have potential for replication at other sites with the expectation of producing similar results;
- Focus on children's strengths as well as needs;
- Show evidence of collaborative involvement with families; and
- Address the issue of cultural diversity.

In addition, assessment practices must acknowledge the benefits of early detection and address the three major components of the disorder (inattention, impulsivity, and hyperactivity). Intervention practices must enhance learning for the target population (teachers, parents, or children) and address skill acquisition of the desired behavior or academic material, as well as behavior maintenance and generalization.

In order to identify promising practices that met these criteria, 15,000 flyers soliciting nominations were distributed to national organizations representing the five stakeholder groups and to a random sample of public schools. Of the 504 practices initially identified, 146 responded to FRC inquiries with detailed written summaries of their individual efforts. Each of these practices was reviewed independently by three stakeholder consultants and assigned points for description, outcomes, and replication potential. In addition to total scores, qualitative ratings indicated whether each practice showed strong promise, some promise, or no promise. Practices were then selected using a double-gating procedure; to pass the first gate, identification practices must have received ratings of strong promise from at least two of three reviewers, while intervention practices must have received ratings of strong or some promise from at least two reviewers as well. To pass the second gate, practices were re-reviewed to ensure that they met all of the criteria described above and that together they represented a diversity of geographical settings and school levels, and a range of academic, social, and behavioral practices.

Ultimately, nine identification practices and 17 intervention practices were chosen for more thorough study. Ten of these 26 practices were selected for site visits, based on the diversity of location and type of practice. Unfortunately, one of the 10 — an intervention practice for students of low socioeconomic status and diverse cultural backgrounds in Baton Rouge, Louisiana — was later abandoned for lack of funding. The other 25 programs are described below. Also, a group of practices used by consultants to the project are described that, while not

reviewed or rated by the FRC project, offer additional practice ideas. Finally, one set of commercially prepared material was submitted to the FRC and reviewed favorably for use with students with ADD.

Findings

Identification

- **Anchorage, Alaska** — In an effort to streamline the process of managing referrals to special education for children with ADD a "gating" procedure was used to determine the level of assessment to be conducted by the school psychologist and nurse. Sufficient data are collected through this process to determine eligibility for special education services, provide adequate information to physicians, and plan educational programs for children with ADD.

- **San Diego, California** — A 5-year grant from the Maternal and Child Health Program (Title V of the Social Security Act) allowed the San Diego school system to create the Project for Attention-Related Disorders. The project was designed to (1) improve the knowledge of school personnel, parents, physicians, and community service providers; (2) improve the coordination of school and community services for ADD; and (3) establish a school-based system for identifying, evaluating, and managing children with ADD.

- **Norwich, Connecticut** — A school-based team of professionals, along with the child's family, designed and monitored interventions within the regular school program in this practice. If more intensive services were needed, the child was referred to a planning and placement team which conducted a more formal evaluation that consisted of 14 specific assessment tests. School psychologists summarized this assessment information and the team made intervention recommendations for the child.

- **Fort Lauderdale, Florida** — The school system developed plans for assessing children under Section 504 of the Rehabilitation Act and designated full-time central office administrators to coordinate efforts for assessment of children with ADD.

- **Louisville, Kentucky** — Four school psychologists developed a districtwide vehicle for assessing children suspected of having ADD. The practice included a system for requesting an assessment; a preassembled packet distributed to referral sources; and a system for responding to the assessment, integrating information obtained, and following up with parents, community service providers, and the school.

- **Salisbury, North Carolina** — In this school system, a support teacher was hired to assist in correctly identifying and intervening with children with ADD. The

support teacher's role ranged from creating schoolwide policy and procedures to consulting with teachers and families.

- **Raleigh, North Carolina** — The Wake County school psychology staff developed a screening procedure to appropriately and consistently assess children with ADD. A screening procedure manual that described assessment and intervention strategies was developed and distributed to all county schools. The procedure included documentation of interventions; parent involvement; and taking developmental and medical histories, observation, and educational testing. Inservice training was also available to the schools.

- **Sturgeon Bay, Wisconsin** — Regular education teachers and parents worked collaboratively to clarify problems, review testing results, and develop intervention plans. If medication was used, a 2-week monitoring plan was developed and shared among the physician, parents, and school counselors. Community networking systems also were established to share resources and information.

- **Kenosha, Wisconsin** - This school system developed a districtwide plan to meet the unique needs of students with ADD in a regular education setting. Mechanisms included

  - **Staff development** — Inservice training (16 hours) was provided for regular and special education teachers and support staff.

  - **Classroom strategies** — Teachers used a range of behavior modification techniques and modified the environment and materials to enhance instruction.

  - **Educational planning** — An individualized education plan was developed for each child with ADD.

  - **Counseling and communication** — A plan for communicating with families and physicians was developed, and a program consultant for children with ADD was hired to assist in evaluation and intervention.

Behavioral Interventions

- **Irvine, California** — In this schoolwide practice, children were screened for ADD by means of teacher ratings, parent interviews, and observational data. Identified students selected for the program received assistance from a paraprofessional aide in a regular education classroom for 12 hours per week; the aide taught them social and cognitive skills. Children who received this training and the services of the aide showed significant improvement in these skills.

- **Suffield, Connecticut** — This school system designed a procedure to increase appropriate behavior and academic performance in children with ADD in both

special and regular education middle school settings. The procedure included daily individualized checklists that were directly related to the child's specific needs and a specific strategy to keep parents informed on a daily basis of their child's school work and behavior.

- **Jacksonville, Florida** — This practice revolved around a "target behavior of the day" system to promote a positive classroom environment for elementary and middle school students. Students identified positive behaviors and were rewarded by the teacher for displaying them.

- **Bradenton, Florida** — A "level" system was used in this practice to improve student behavior and academic productivity in a self-contained classroom of children with serious emotional disturbances, many of whom also have ADD. Upon entering the program, children began at level 1, which has specific rules and consequences for breaking them. Points were earned, and movement to the next level was contingent on prior weeks' performance. The practice included daily feedback and a reinforcement program.

- **Des Moines, Iowa** — A behavior modification program using positive reinforcement and training was developed for use with preschool children. Teachers generated classroom rules, reviewed them daily, and practiced them with the group. In addition, photographs of students displaying appropriate behaviors were posted. Appropriate behaviors were rewarded immediately, and inappropriate behaviors were ignored. Daily notes were sent to parents.

- **Omaha, Nebraska** — This practice was a school and home behavior management strategy for classroom intervention. It involved targeting specific behaviors and reinforcing them through a system of earned points and privileges and increasing the amount of contact between teachers and students. After training in the use of the system by a case manager, teachers and family worked cooperatively to reward appropriate behavior.

<u>Organizational Strategies</u>

- **Lake Villa, Illinois** — This practice involved a multidisciplinary school conference to solve problems and set goals for a student with ADD. Intervention plans and weekly progress reports were shared in regular conferences with both parents and the student. The student was involved in all ongoing planning and decision making. A case manager system was used to coordinate implementation of the work at school and with the family.

- **Boardman, Ohio** — This practice helped a special education teacher develop organizational skills for students with ADD, increase completion of assignments, and improve communication between home and school. Both the teacher and parents monitored a homework assignment sheet closely, and children attended evening homework classes if they failed to finish their homework twice in a 10-day period.

- **Drexel Hill, Pennsylvania** — In this practice a middle school teacher provided visual aids to help students with ADD complete notebook assignments in geography.

Academic Interventions

- **Orlando, Florida** — This site used cooperative learning methods in a heterogeneous classroom that included children with ADD, co-taught by a regular teacher and a special education teacher. Cooperative learning groups were established after the teachers reviewed the children's records, completed a student inventory, assessed the classroom climate and materials, and contacted parents.

- **Sandy, Utah** — In an effort to increase students' work productivity and reduce their disruptive behavior, this practice involved use of a tic-tac-toe game tied to work assignments to reinforce positive behavior and academic progress. Group and individual contingencies were employed. The intervention was implemented in regular and special education settings.

Training

- **Colorado Springs, Colorado** — A five-hour inservice training program was provided for parents and educators who were involved with children with ADD. Community members, such as local physicians, and parents participated as trainers in the program.

- **Towson, Maryland** — To address the challenges associated with educating children with ADD, the Baltimore County public schools undertook a variety of activities. The school system developed literature to be distributed to every parent and teacher in the county and held special faculty meetings at the school level to present information on ADD. A 10-hour training program and forum for parents was provided at three high school sites. School staff worked collaboratively with the Parent-Teacher Association to develop workshops on community liaison for assisting children with ADD. The local director of Children With Attention Deficit Disorders served as a presenter for inservice training.

- **Billings, Montana** — Training programs for parents and educators were provided by a school psychologist. The 8-hour parent workshop provided strategies for including families in interventions for children with ADD. The 15-hour educators' workshop was approved by Eastern Montana College for graduate or undergraduate credit.

- **Reno, Nevada** — A 16-hour inservice program for school teachers, counselors, psychologists, and nurses was designed to foster effective educational interventions for children with ADD. The inservice was planned to help teachers understand the disorder in a social environment and to provide them with practical information regarding interventions. A variety of community resources were used to assist in the workshops.

- **North Canton, Ohio** — This practice incorporated the efforts of a parent support group to train other parents, educators, and the community about ADD. The group's services included: production and dissemination of newsletters, a handbook on ADD, and information packets; provision of videotapes and speakers at inservice meetings; presentations at workshops and conferences; ongoing research on medical, educational, and legislative activities; and participation in local, regional, state, and national organizations related to ADD.

Practices of Project Consultants

- **Ames, Iowa** — Dan Reschley at Iowa State University is conducting parent training for families of children with ADD using Russell Barkley's parent training model. The model increases parents' knowledge of ADD, and instructs parents on the benefits of positive play, on how to use language to increase compliance of children, and how to implement effective behavioral strategies with children.

- **Lexington, Kentucky** — In 1989, Barbara Burcham, Richard Milich and colleagues at the University of Kentucky entered into a project with the Kentucky State Department of Education to develop a state-wide teacher training program on ADHD. An instructional manual and video tape were developed. Topics covered include: an overview of ADHD, how to identify ADHD in the classroom, assessment strategies, medication and family interventions, classroom interventions, and resources.

- **Worcester, Massachusetts** — Russell Barkley and Terri Shelton from the University of Massachusetts obtained a grant from the National Institute of Mental Health in collaboration with the Worcester public schools to design and evaluate a kindergarten program for youngsters at risk for ADD or oppositional behaviors. The program they designed is modeled after the University of California, Irvine's paraprofessional program for ADD which is implemented in a regular classroom with a teacher and an aide. The program itself consists of a behavioral intervention component and a social skills component. Parents are involved through a daily report which details the skills being taught and feedback on the child's performance for the day.

- **Lansing, Michigan** — In 1986, a parent and teacher, Pat Tome, formed a support group for people interested in ADD. Its goals are to inform its members about ADD, to help schools educate children with ADD, and to disseminate information about ADD to parents and teachers. The group has grown to more than 300 members in five satellite locations and is now affiliated with Children with Attention Deficit Disorders (CHADD).

- **Minneapolis, Minnesota** — Jason Walker, through his work at the Pilot City Mental Health Center in collaboration with the Minneapolis public schools, developed an early identification process to reduce the risk of misidentifying culturally diverse children with ADD as having conduct disorders or academic performance deficiencies. This process includes an initial clinical interview with

the parents, the completion of standardized behavior rating scales, teacher interviews, and classroom observations.

- **Pittsburgh, Pennsylvania** — Since 1980, William Pelham has been operating a summer day treatment program for children with ADHD. The unique feature of this program is its intensive, individualized treatment which is centered around a behavioral point system administered by counselors. Other interventions include social skills training, both computer-assisted and regular academic instruction, and group problem solving. Parents are involved in weekly training sessions to help them learn to implement effective behavioral management programs at home and through daily report cards detailing their child's performance. At the end of the summer, follow-up treatments are offered. They include: a Saturday treatment program, which is similar to the summer program; school interventions in the classroom; and further parent training.

- **Eugene Oregon** — The SUCCESS (Success Using Contingencies to Create Effective Social Skills) Program developed by Hill Walker and his colleagues, consists of four separate programs that are designed to improve the social behaviors of children with behavior problems in grades K-3. The programs focus on four problems children experience, including disruptive behavior, low academic survival skills, social aggression, and social withdrawal. The program that focuses on disruptive behavior is most often used with children with ADD. It consists of a set of procedures instituted by a consultant who employs rewards to shape appropriate classroom behaviors. Points earned at school are exchanged for group activity rewards and reinforced with a home reward system. Control of the program is turned over to the teacher, who gradually fades out the point system and maintains appropriate behavior by contingent social praise.

Commercial Material

- **Longmont, Colorado** — Project RIDE (Responding to Individual Differences in Education) authored by Ray Beck is a support system which operates on the premise that teachers can become their own best problem solvers. This material contains ways to help teachers examine their management strategies and implement school-wide assistance teams. It also contains descriptions of hundreds of intervention strategies.

Conclusion

As the FRC staff and consultants reviewed promising assessment and intervention practices for students with ADD and completed site visits of schools engaged in this work, several factors that seemed to positively influence the students' educational outcomes emerged. These were:

- Although there are global issues involved in serving students with ADD, schools engaged in promising work were attentive to individual student differences when designing specific educational plans for these students;

- The personnel interviewed and observed demonstrated a common commitment to working with students with ADD, understood the disorder's complexity, and believed strongly in the services they were providing. In-service training for professionals working with students with ADD and the development of an appropriate match between teacher expectations and student performance seemed to be important elements of promising practices;

- Students with ADD often experience social rejection from their peer group. Therefore, schools doing promising work with these students were assessing their social competence and involving them in a variety of social skills training programs. In addition, some schools were exploring methods of pairing students with ADD with non-identified peers in social experiences;

- Administrators at promising practice sites recognized ADD as a disability and provided strong fiscal and staff support for the development and implementation of promising practices; and

- Schools engaged in promising work with students with ADD often had a genuine commitment to working with students' families. Examples of activities include: inviting parents to participate as trainers in staff development activities; providing child care during parent-teacher conferences; and cooperatively developing newsletters targeting issues of concern for both parents and educators.

MEDICATION

RESEARCH SYNTHESIS ON THE EFFECTS OF STIMULANT MEDICATION ON CHILDREN WITH ATTENTION DEFICIT DISORDER: A REVIEW OF REVIEWS

EXECUTIVE SUMMARY

JAMES M. SWANSON

Introduction

Historically, a large percentage of children diagnosed with Attention Deficit Disorder (ADD) have been treated with stimulant medication.[3] However, in the face of diagnostic uncertainty about ADD and changing labels for the condition, the wisdom of using stimulant medication for such large groups of children has been questioned.

The first study in the literature on the use of stimulant medication to treat children with ADD is commonly attributed to Bradley, conducted in 1937. But rigorous research on this topic did not start until the 1960s. By 1970, the use of stimulant medication had become so widespread that it created controversy. Controversies have persisted for the last two decades, but the prevalence of stimulant therapy has remained relatively high; the literature suggests that from two to six percent of all elementary school-aged children may be treated with stimulant medication, and that from 60 to 90 percent of school-aged children with an ADD diagnosis are treated with stimulant medication for a prolonged period of time.

As a result of this continuing uncertainty about the risks and benefits of stimulant medication, the University of California at Irvine (UCI) ADD Center performed a review and synthesis of a large literature addressing the use of stimulant medication to treat children with ADD. The definition of response to stimulant medication and the basis for consensus and

[3] In this report, the term "stimulant medication" will be used to refer to the class of drugs which includes d-amphetamine (Dexedrine), methylphenidate (Ritalin), and pemoline (Cylert).

controversy about the use of medication were identified as important topics to be addressed in this work.

Methodology

The literature on the effects of stimulant medication on children with ADD is massive; the UCI research team located more than 9,000 original articles and more than 300 literature reviews on this topic. As a result, the UCI Center decided to perform a "review of reviews," to synthesize this large literature spanning nearly 55 years of research on the use of stimulants to treat children with ADD.

A rigorous methodology recommended by Harris Cooper of the University of Missouri was adapted for use in this project to define the scope of "the review of reviews." Two strategies to locate extant reviews were used: (1) a computer search of electronic data bases, and (2) an expert search of work by established researchers. This dual search strategy yielded a total of 338 unique reviews.

As an initial step in their evaluation, UCI researchers looked for relationships among findings of literature reviews that were performed at about the same time and that were focused on similar topics. They then identified the effects of medication that appeared to be robust on the basis of agreement across reviews. These areas of consensus in the literature were used to draw conclusions about what should and should not be expected when stimulant medication is used to treat children with ADD.

Conclusion

The UCI report evaluated agreement across reviews and interpreted high levels of agreement as consensus about the effects of stimulant medication. Specific disagreements which endured over time were interpreted as controversy about the use of stimulant medication. Findings in each category are presented below.

Areas of Consensus about the Effects of Stimulant Medication

Although source-overlap was relatively low (25 to 50 percent) across several sets of topic-matched and time-matched reviews, agreement across reviews was high for the reviews' conclusions about the effects of stimulant medication on children with ADD. The literature covered by the reviews suggested that in most (but not all) cases, a clear and immediate short-term benefit of stimulant medication was perceived by parents, teachers, and physicians in terms of the management of symptoms and associated features of ADD. This consensus in the face of low source-overlap suggests that these findings of short-term effects of stimulant medication on children with ADD are robust.

In addition, the review of reviews identified 10 areas of agreement about what should and should not be expected of stimulant medication that is used to treat children with ADD:

- Response Rate. Fifty-five years of reviews suggest that about 70 percent of children with ADD respond favorably to stimulant drugs, despite changes over time in the diagnostic criteria and labels used to define the disorder;

- Effects on Diagnostic Symptoms. In the majority of children with ADD who responded favorably to stimulants, the response included temporary management of the symptoms of ADD (i.e., a decrease in inattention, impulsivity, and hyperactivity) and a time-limited increase in concentration and goal-directed effort. Across relevant reviews, 97 percent agreed with this description of short-term effects;

- Effects of Associated Features. In reviews which addressed associated features of ADD which commonly occur in some affected children (such as deviant deportment, high levels of aggression, inappropriate social interaction, and poor academic productivity), 94 percent agreed that a component of response to stimulant medication was a decrease in these disruptive behaviors;

- Side Effects. In reviews which addressed side effects (such as minor problems of anorexia and insomnia, serious problems associated with motor and verbal tics, and psychological impairment in the areas of cognition and social interaction), almost all (99 percent) acknowledged the existence of some side effects and the clinical necessity to monitor and manage these effects;

- Long-Term Effects. In the reviews which addressed the issue of long-term effects of stimulant medication, 88 percent acknowledged the lack of demonstrated long-

term effects on important outcomes (i.e., social adjustment and academic achievement);

- Paradoxical Response. Some early influential reviews asserted that stimulant medication "calmed" or "subdued" children with ADD, which was represented as a paradoxical response. However, in reviews which addressed this topic, 78 percent concluded that in children with ADD, the behavioral, physiological and psychological responses to clinical doses of stimulant medication (i.e., increased concentration and goal-directed effort) were not qualitatively different from the responses of normal children and adults to equivalent doses. Thus, most reviews of the use of stimulant medication to treat children with ADD did not characterize the typical clinical response as a paradoxical response;

- Effects on High Order Processes. A subset of reviews addressed the effects of stimulant medication on complex behavior requiring high-order skills (e.g., learning, reading, etc.) as well as on simple behavior requiring low-order skills (e.g., performing rote tasks, monitoring a repetitive display, etc.). Most (72 percent) of these reviews acknowledged the lack of a demonstrated beneficial effect of stimulant medication on performance of complex tasks or behaviors which required the use of high-order skills;

- Prediction of Response. Some reviews addressed the methods of evaluating a trial response to stimulant medication, and the prediction of response on the basis of behavioral, cognitive, physiological, biochemical, or neurological measures. Most reviews (68 percent) acknowledged poor prediction of these measures;

- Recommendations about Clinical Use. Across the past half century, most reviews were written by clinicians and most (91 percent) supported some clinical use of stimulant medication to treat children with ADD. However, in each era of the past half century, some reviews have addressed the same issues which generate controversy and have questioned this established clinical practice; and

- Recommendations for Multimodality Treatment. Many reviews ended with a recommendation for combinations of psychosocial and pharmacological interventions, but in most (70 percent) of these reviews, specific references to support this common-sense recommendation were not provided, and when references were specified they provided little empirical data to support this recommendation.

Areas of Controversy about the Effects of Stimulant Medication

The controversies which have persisted over time (and are consistent with acknowledged effects of stimulant medication) are: (1) the lack of diagnostic specificity for short-term effects; (2) the lack of effects on learning or complex cognitive skills; (3) potential side effects and

adverse effects; and (4) the lack of evidence of significant long-term effects. Most importantly, despite a common understanding of the effects of stimulant medication in the literature, there was little agreement across reviews about whether stimulant medication should be used to treat children with ADD. Some reviews supported the established and widespread clinical practice of treating the symptoms of ADD with stimulant medication. Others, however, did not, or recommended major changes in the use of stimulant medication.

The consensus about the effects of stimulant medication and the enduring controversies about its widespread use suggest that decisions to treat a child with ADD through stimulant medication should be made very carefully. The UCI research synthesis identifies recent reviews which recommend systematic methods of assessing responses to stimulant medication, such as: (1) the use of double-blind procedures[4]; (2) the evaluation of responses in both home and school settings; and (3) the consideration of cognitive (mental) as well as behavioral effects. The synthesis also identifies reviews which point out important qualifications and limitations of existing research. Finally, three reviews are identified that promise to make important additions to the existing literature, concerning the effects of stimulant medication on ADD children's academic productivity, aggression, and social interaction.

[4]A method of testing the effects of medication in which neither the doctor nor the patient know what medication is administered. In this way, both the doctor and patient's expectations for the drug's effects can be neutralized.